OM-233 381E 2009–10

Processes

Stick (SMAW) Welding

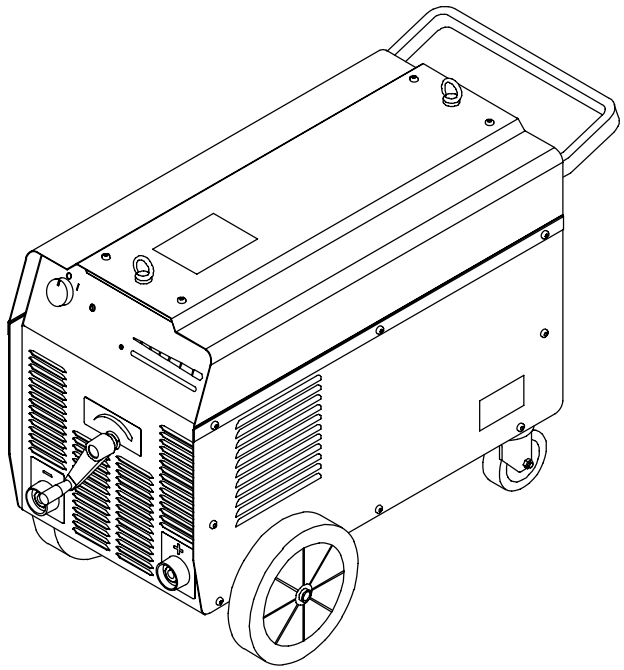
Description

DC CC 3 Phase

Arc Welding Power Source

Blue Thunder Series

CE Models



Models: 253, 343, 403, 443

OWNER'S MANUAL

Visit our website at

www.MillerWelds.com

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide which exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets.

TRUE BLUE® WARRANTY

Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.

Miller®

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WARRANTY

Declaration of Conformity for European Community (CE) Products

☞ *This information is provided for units with CE certification (see rating label on unit).*

Manufacturer:

ITW Welding Products Italy S.r.l.
Via Privata Iseo 6/E
20098 San Giuliano
Milanese, Italy
Phone: 39(02)98290-1

European Contact:

Mr. Danilo Fedolfi,
Managing Director
ITW Welding Products Italy S.r.l.
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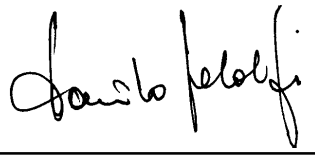
20098 San Giuliano
Milanese, Italy
Phone: 39(02)98290-1
Fax: 39(02)98290203

European Contact Signature: 

Declares that this product: **Blue Thunder 253, 343, 403, 443**

conforms to the following Directives and Standards:

Directives

Low Voltage Directive: 73/23/EEC, 2006/95/EC

Electromagnetic Compatibility Directives: 89/336/EEC, 92/31/EEC, 2004/108/EC

Machinery Directives: 98/37EEC, 91/368/EEC, 92/31/EEC, 133/04, 93/68/EEC

CE Marking Directive: 93/68/EEC

Standards

Arc Welding Equipment – Part 1: Welding Power Sources. IEC 60974-1 Ed. 3, 2005-07

Arc Welding Equipment – Part 10: Electromagnetic Compatibility (EMC) Requirements. IEC 60974-10 Ed. 1.1, 2004-10

Degrees of Protection Provided By Enclosures (IP Code): IEC 60529 Ed. 2.1, 2001-02

The product technical file is maintained by the responsible Business Unit(s) located at the manufacturing facility.

SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

Protect yourself and others from injury — read and follow these precautions.

1-1. Symbol Usage

DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE *– Indicates statements not related to personal injury.*

☞ *Indicates special instructions.*

This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.

Only qualified persons should install, operate, maintain, and repair this unit.

During operation, keep everybody, especially children, away.

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists in inverter welding power sources AFTER removal of inputpower.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

HOT PARTS can burn.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

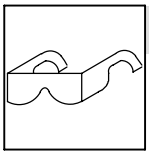
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or by-pass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.



FLYING METAL or DIRT can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

ELECTRIC AND MAGNETIC FIELDS (EMF) can affect ImplantedMedical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

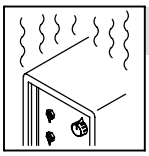
1-3. Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.

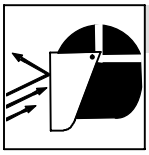
FALLING EQUIPMENT can injure.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep equipment (cables and cords) away from moving vehicles when working from an aerial location.
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94–110) when manually lifting heavy parts or equipment.



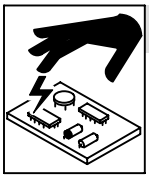
OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



FLYING SPARKS can injure.

- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires — keep flammables away.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can injure.

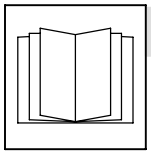
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

WELDING WIRE can injure.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

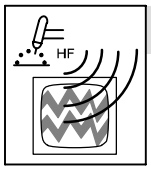
MOVING PARTS can injure.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when maintenance is finished and before reconnecting input power.



READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manuals, industry standards, and national, state, and local codes.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. California Proposition 65 Warnings

Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

For Gasoline Engines:

Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

For Diesel Engines:

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

1-5. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org and www. sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website:www.cganet.com).

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org.

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 OSHA Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

U.S. Consumer Product Safety Commission (CPSC), 4330 East West Highway, Bethesda, MD 20814 (phone: 301-504-7923, website: www.cpsc.gov).

Applications Manual for the Revised NIOSH Lifting Equation, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333 (phone: 1-800-232-4636, website: www.cdc.gov/NIOSH).

1-6. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). Welding current creates an EMF field around the welding circuit and welding equipment. EMF fields may interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, access restrictions for passers–by or individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

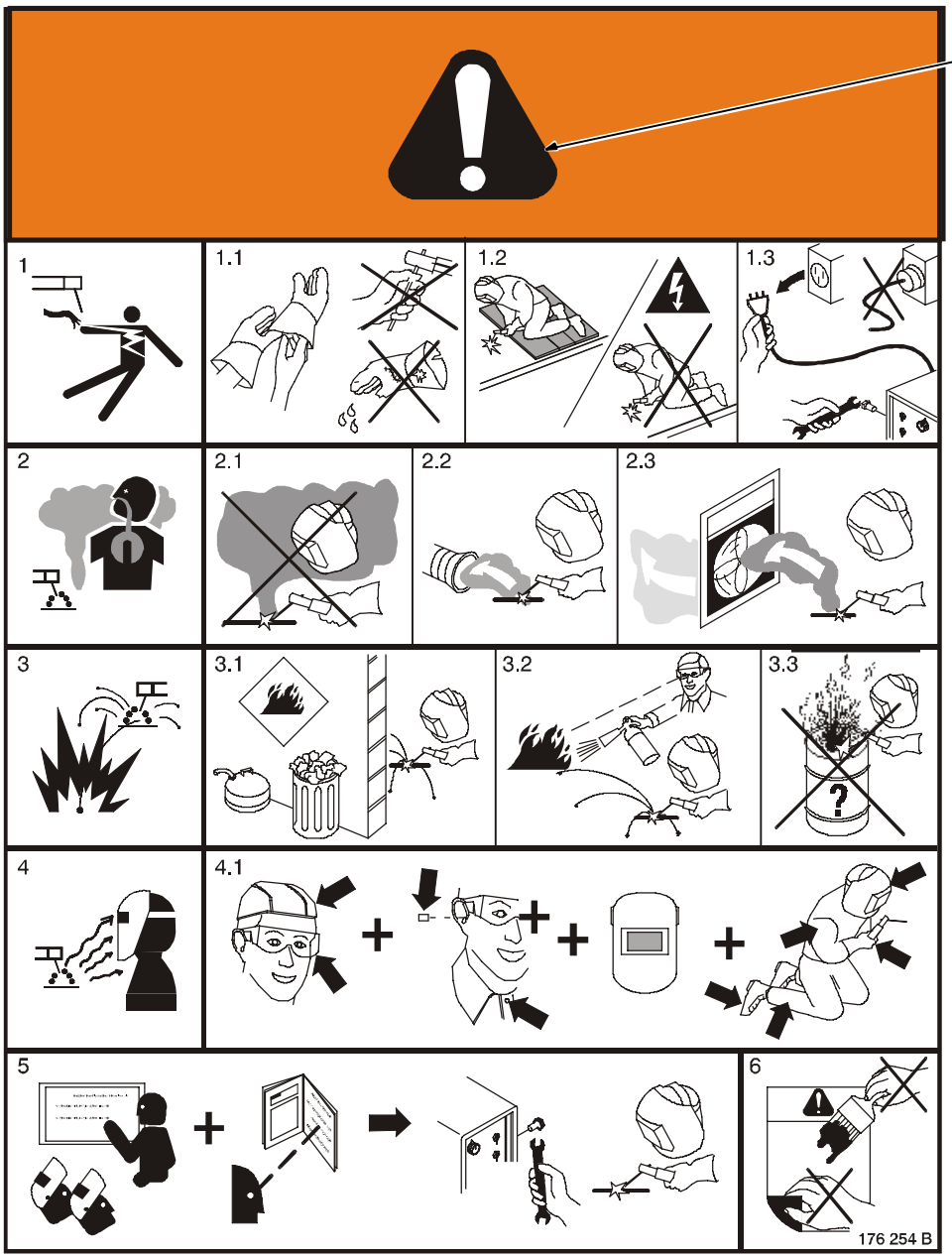
1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source or wire feeder.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – DEFINITIONS

2-1. Warning Label Definitions (For Wordless Labels)



Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Electric shock from welding electrode or wiring can kill.

1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.

1.2 Protect yourself from electric shock by insulating yourself from work and ground.

1.3 Disconnect input plug or power before working on machine.

2 Breathing welding fumes can be hazardous to your health.

2.1 Keep your head out of the fumes.

2.2 Use forced ventilation or local exhaust to remove the fumes.

2.3 Use ventilating fan to remove fumes.

3 Welding sparks can cause explosion or fire.

3.1 Keep flammables away from welding. Do not weld near flammables.

3.2 Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.

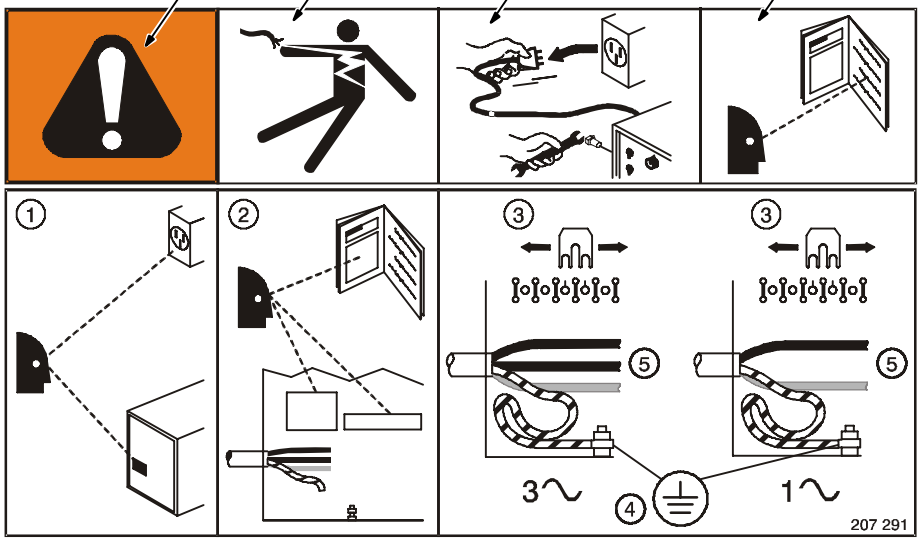
3.3 Do not weld on drums or any closed containers.

4 Arc rays can burn eyes and injure skin.

4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

5 Become trained and read the instructions before working on the machine or welding.

6 Do not remove or paint over (cover) the label.



Warning! Watch Out! There are possible hazards as shown by the symbols.

Electric shock from wiring can kill.

Disconnect input plug or power before working on machine.

Read the Owner's Manual before working on this machine.

1 Consult rating label for input power requirements, and check power available at the job site – they must match.

2 Read Owner's Manual and inside labels for connection points and procedures.

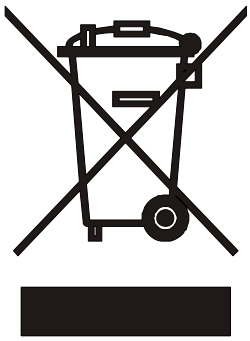
3 Move jumper links as shown on inside label to match voltage at job site.

4 Having a loop of extra length, connect grounding conductor first.

5 Connect line input conductors as shown on inside label – double-check all connections, jumper link positions, and input voltage before applying power.

1/96

2-2. WEEE Label (For Products Sold Within The EU)



Do not discard product (where applicable) with general waste.

Reuse or recycle Waste Electrical and Electronic Equipment (WEEE) by disposing at a designated collection facility.

Contact your local recycling office or your local distributor for further information.

2-3. Symbols And Definitions

A — Amperes	— — Negative Weld Output Terminal	+ — Positive Weld Output Terminal	Protective Earth (Ground)
Output	Supplementary Protector	Off	On
V — Volts	Shielded Metal Arc Welding (SMAW)	V — Input	Remote
Constant Current (CC)	X — Duty Cycle	I_1 — Rated Supply Current	Three Phase Transformer Rectifier
U_0 — Rated No-Load Voltage (Average)	U_1 — Rated Supply Voltage	Fuse	Line Connection
Current Increase Scale		Current Increase/ Decrease	

SECTION 3 – INSTALLATION

3-1. Serial Number And Rating Label Location

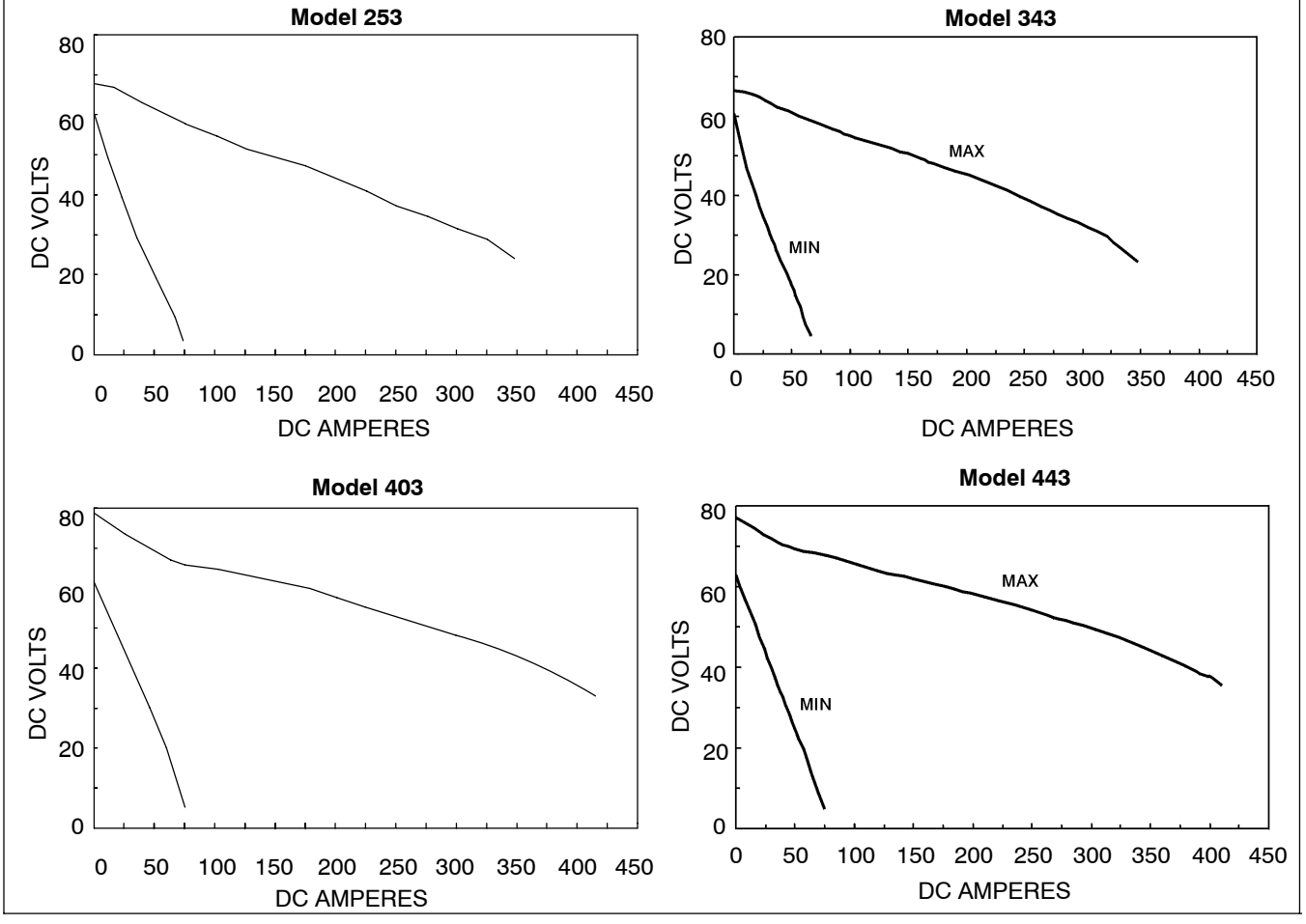
The serial number and rating information for this product is located on the back . Use rating label to determine input power requirements and/or rated output. For future reference, write serial number in space provided on back cover of this manual.

3-2. Specifications

Model	Rated Welding Output	Ampere Range DC	Max Open-Circuit Voltage DC	IP Rating	Amperes Input at Rated Load Output, 50/60 Hz, Three-Phase				KVA/KW	Weight	Dimensions (mm) L x W x H
					230 V	380 V	400 V	520 V			
253	220 A @ 29 Volts DC, 35% Duty Cycle	30-220 A	59-66 V	IP22	36 A	--	21 A	--	14.6/12	80 kg	980 x 410 x 650
343	320 A @ 32.8 Volts DC, 35% Duty Cycle	50-320 A	68 V	IP22	55 A	32 A	32 A	23 A	22/18	105 kg	980 x 410 x 650
403	400 A @ 36 Volts DC, 35% Duty Cycle	60-400 A	66-73 V	IP22	73 A	--	42 A	--	28/23	115 kg	980 x 410 x 650
443	420 A @ 36.8 Volts DC, 45% Duty Cycle	60-420 A	78 V	IP22	80 A	47 A	47 A	34 A	32/26	175 kg	1150 x 520 x 730

3-3. Volt-Ampere Curves

The volt-ampere curves show the normal minimum and maximum voltage and amperage output capabilities of the unit.



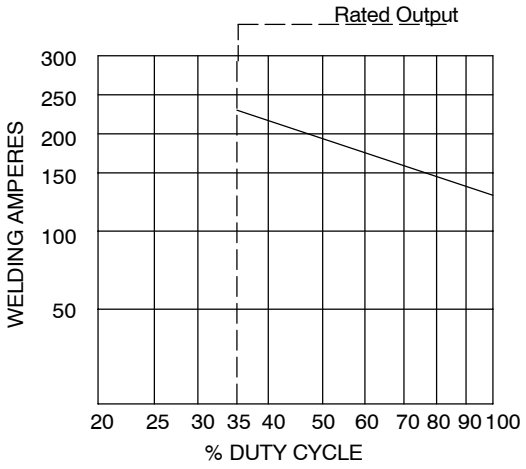
3-4. Duty Cycle and Overheating

Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

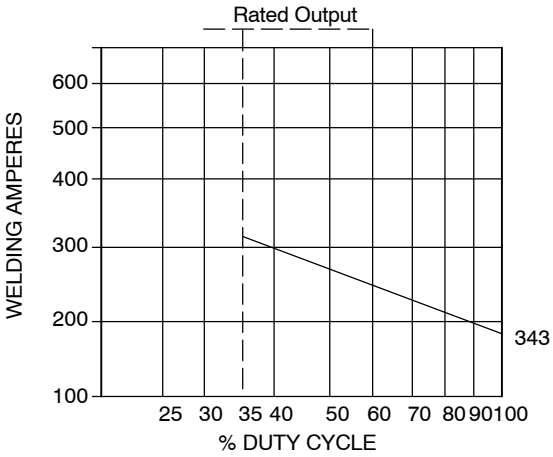
If unit overheats, thermostat(s) opens, output stops, and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before welding.

NOTICE – ***E****xceeding duty cycle can damage unit and void warranty.*

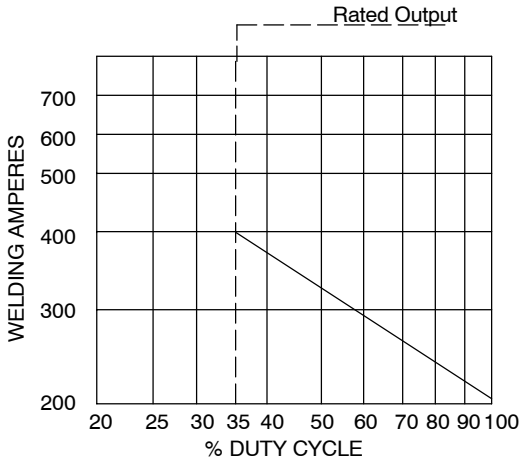
Model 253 – 35% Duty Cycle



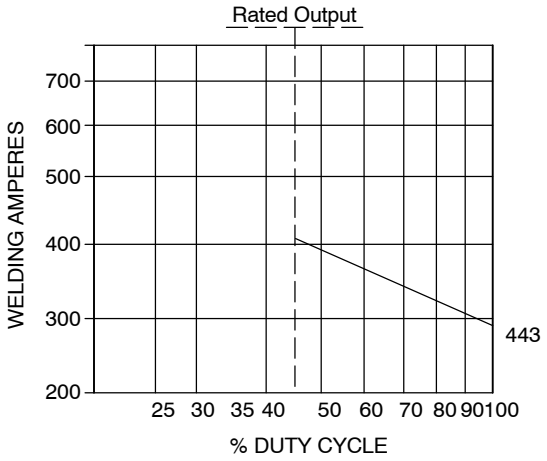
Model 343 – 35% Duty Cycle



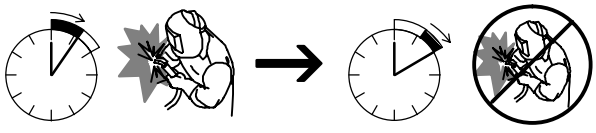
Model 403 – 35% Duty Cycle



Model 443 – 45% Duty Cycle

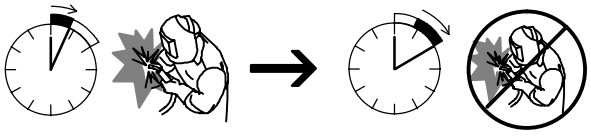


35% Duty Cycle



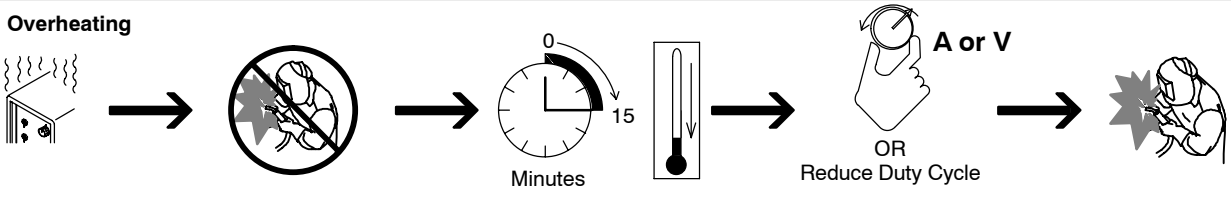
3.5 Minutes Welding — 6.5 Minutes Resting

45% Duty Cycle

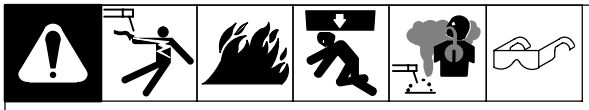


4.5 Minutes Welding — 5.5 Minutes Resting

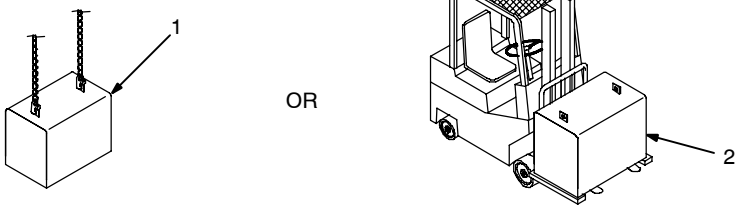
Overheating



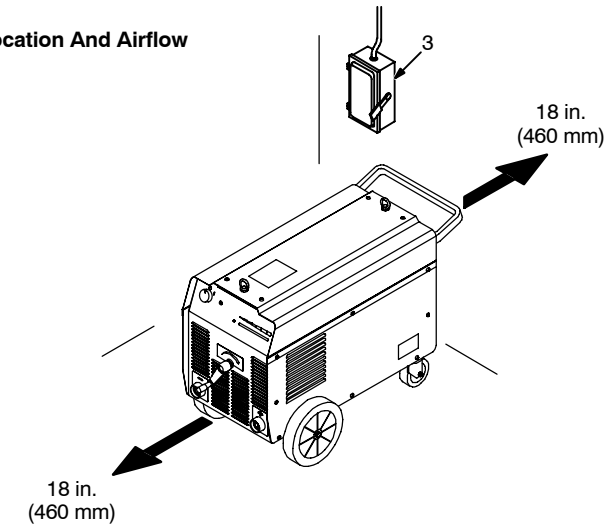
3-5. Selecting A Location



Movement



Location And Airflow



1 Lifting Eye

2 Lifting Forks

Use lifting eye or lifting forks to move unit.

If using lifting forks, extend forks beyond opposite side of unit.

3 Line Disconnect Device

Locate unit near correct input power supply.

Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.

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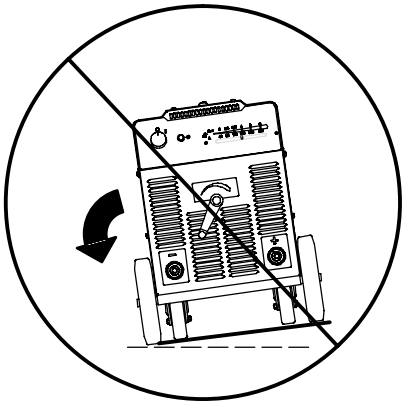
3-6. Tipping



Do not move or operate unit where it could tip.

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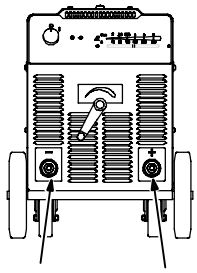
3-7. Weld Output Terminals and Selecting Cable Sizes

NOTICE *– The Total Cable Length in Weld Circuit (see table below) is the combined length of both weld cables. For example, if the power source is 30 m (100 ft) from the workpiece, the total cable length in the weld circuit is 60 m (2 cables x 30 m). Use the 60 m (200 ft) column to determine cable size.*

Weld Output Terminals **Turn off power before connecting to weld output terminals.** **Do not use worn, damaged, undersized, or poorly spliced cables.**	**Welding Amperes**	**Weld Cable Size** and Total Cable (Copper) Length in Weld Circuit Not Exceeding***** **30 m (100 ft) or Less**		**45 m (150 ft)**	**60 m (200 ft)**	**70 m (250 ft)**	**90 m (300 ft)**	**105 m (350 ft)**	**120 m (400 ft)**
		10 – 60% Duty Cycle	**60 – 100% Duty Cycle**	**10 – 100% Duty Cycle**					
		mm^2 (AWG)	**mm^2 (AWG)**	**mm^2 (AWG)**					
 Negative Terminal Positive Terminal 804 944	100	20 (4)	20 (4)	20 (4)	30 (3)	35 (2)	50 (1)	60 (1/0)	60 (1/0)
	150	30 (3)	30 (3)	35 (2)	50 (1)	60 (1/0)	70 (2/0)	95 (3/0)	95 (3/0)
	200	30 (3)	35 (2)	50 (1)	60 (1/0)	70 (2/0)	95 (3/0)	120 (4/0)	120 (4/0)
	250	35 (2)	50 (1)	60 (1/0)	70 (2/0)	95 (3/0)	120 (4/0)	2x70 (2 ea. 2/0)	2x70 (2 ea. 2/0)

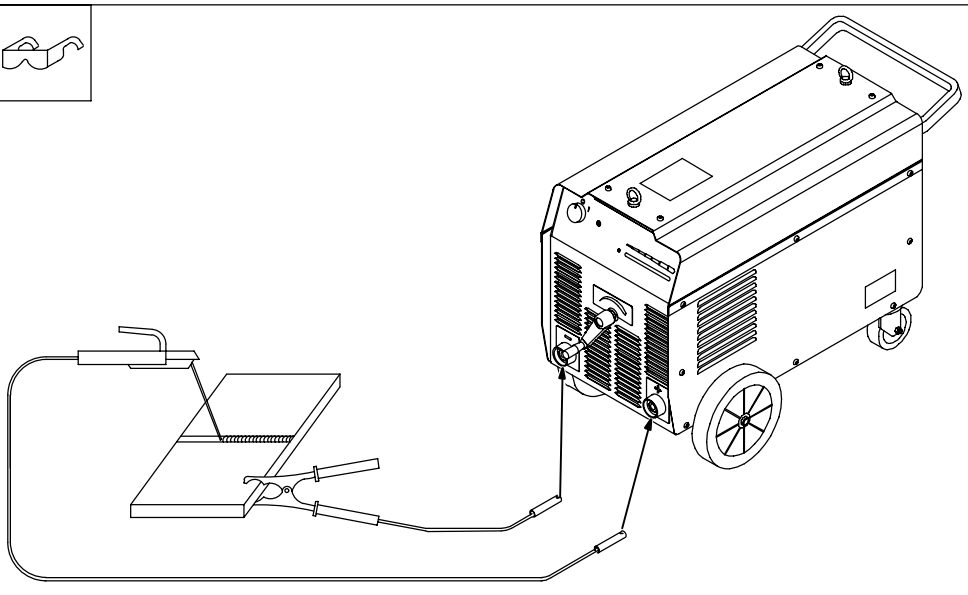
* This chart is a general guideline and may not suit all applications. If cable overheats, use next size larger cable.

**Weld cable size is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.

***For distances longer than those shown in this guide, call a factory applications representative.

Milan Ref. S-0007-G 2009–08

3-8. Typical Connections For Stick (SMAW) Welding



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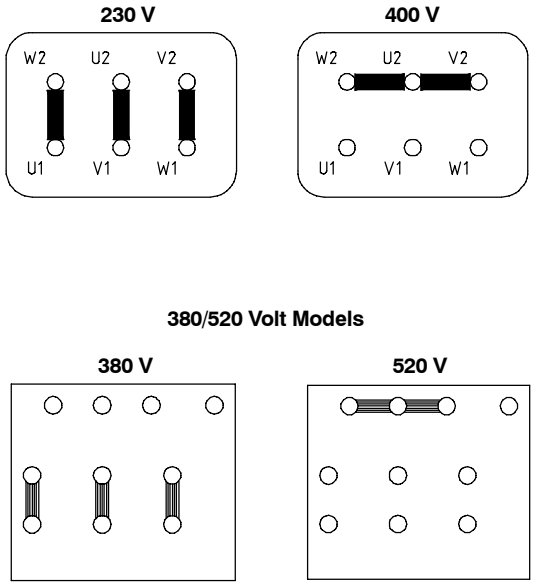
3-9. Positioning Jumper Links



Check input voltage available at site.

1 Jumper Links Access

Remove side panel.

2 Jumper Link Label

Check label – only one is on unit.

3 Input Voltage Jumper Links

Move jumper links to match input voltage.

Close and secure side panel.

Ref. S9215023 / Ref S9215018

3-10. Electrical Service Guide

Failure to follow these fuse and circuit breaker recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated branch circuit that applies to the rated output and duty cycle of the welding power source.

	253		343				403		443			
Input Voltage (V)	230	400	230	380	400	520	230	400	230	380	400	520
Input Amperes (A) At Rated Output	36	21	55	32	32	23	73	42	80	47	47	36
Max Recommended Standard Fuse Rating In Amperes [1]												
Time-Delay Fuses [2]	45	25	60	40	40	30	80	50	100	60	50	40
Normal Operating Fuses [3]	50	30	80	50	48	35	110	60	125	70	70	50
Min Input Conductor Size In AWG [4]	10	14	8	10	12	12	8	10	6	8	10	10
Max Recommended Input Conductor Length In Feet (Meters)	106 (32)	127 (39)	107 (33)	193 (59)	130 (40)	220 (67)	84 (25)	168 (51)	114 (35)	202 (61)	148 (45)	251 (76)
Min Grounding Conductor Size In AWG [4]	10	14	8	10	12	12	8	10	6	8	10	10

** Power cord supplied with the unit is sized for 230V operation. Larger power cord may be required for cable lengths greater than 3 meters. Consult national and local regulations.

Reference: 2008 National Electrical Code (NEC) (including article 630)

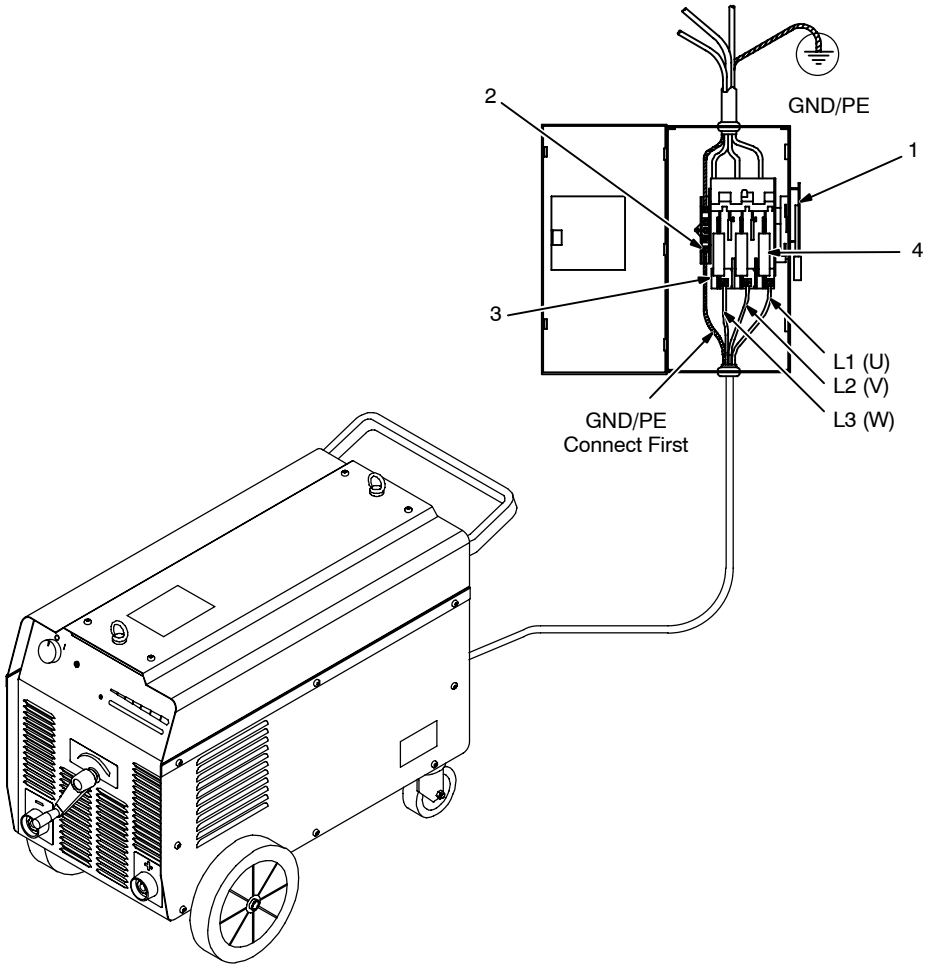
1 If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.

2 “Time-Delay” fuses are UL class “RK5” . See UL 248.

3 “Normal Operating” (general purpose - no intentional delay) fuses are UL class “K5” (up to and including 60 amps), and UL class “H” (65 amps and above).

4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.16. If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.

3-11. Connecting Input Power



⚠ **Installation must meet all National and Local Codes – have only qualified persons make this installation.**

⚠ **Disconnect and lockout/tagout input power before connecting input conductors from unit.**

⚠ **Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.**

⚠ **Make input power connections to the welding power source first.**

⚠ **Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.**

NOTICE *– Verify jumper links match input voltage (see Section 3-9).*

See rating label on unit and check input voltage available at site.

1 Disconnect Device (switch shown in OFF position)

2 Disconnect Device (Supply) Grounding Terminal

Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.

3 Disconnect Device Line Terminals

Connect input conductors L1 (U), L2 (V) And L3 (W) to disconnect device line terminals.

4 Overcurrent Protection

Select type and size of overcurrent protection using Section 3-10 (fused disconnect switch shown).

Close and secure door on line disconnect device. Remove lockout/tagout device, and place switch in the On position.

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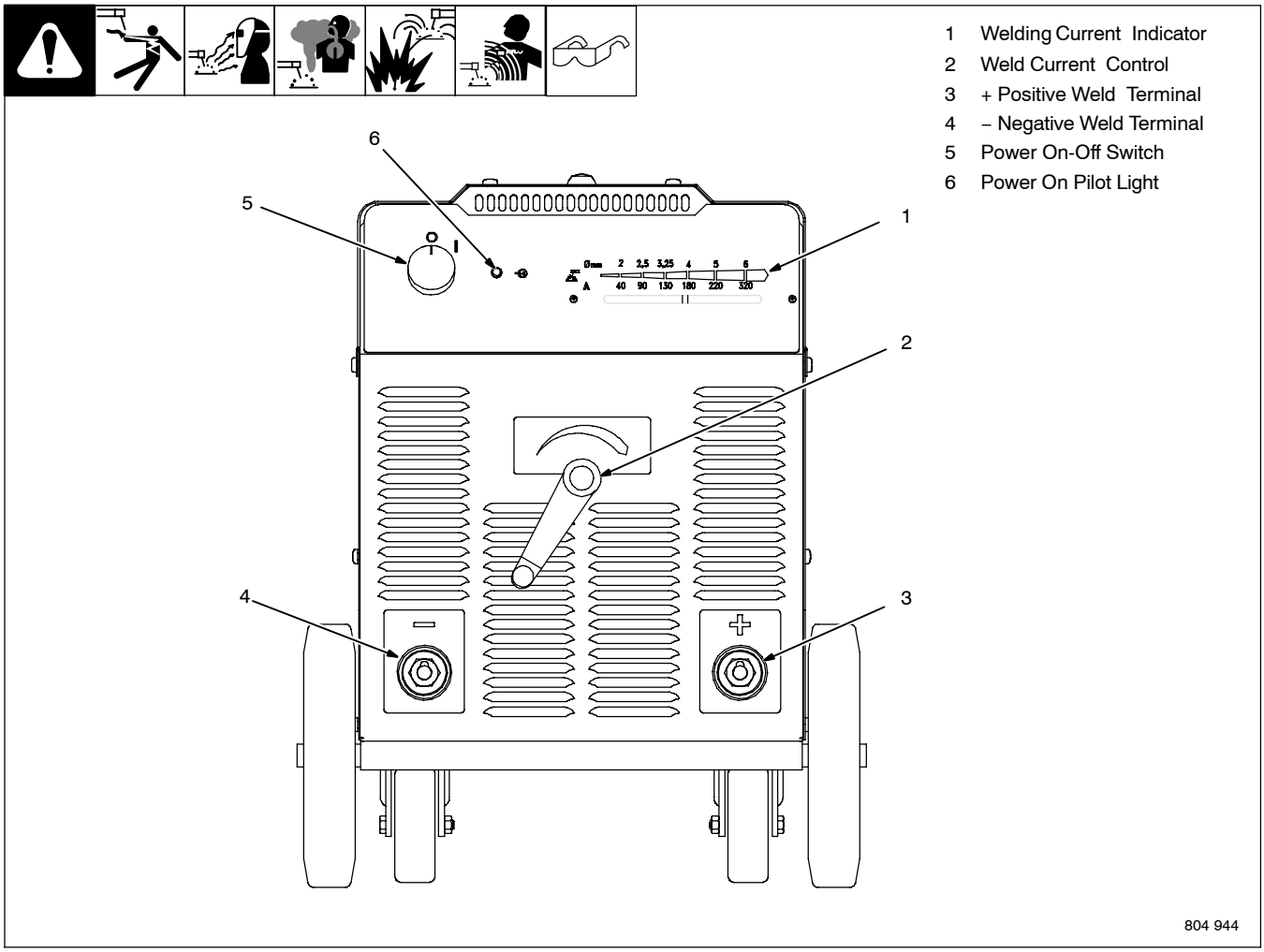
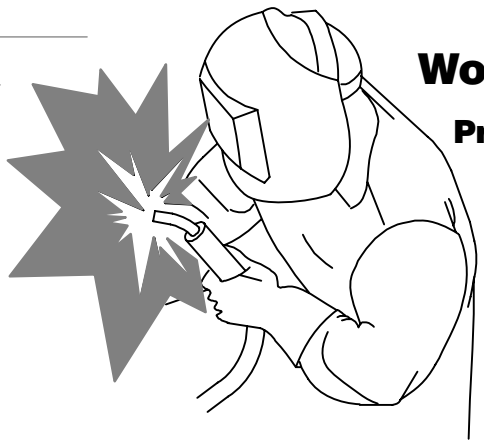
SECTION 4 – OPERATION

4-1. Controls


1 Welding Current Indicator
2 Weld Current Control
3 + Positive Weld Terminal
4 – Negative Weld Terminal
5 Power On-Off Switch
6 Power On Pilot Light
804 944

Notes

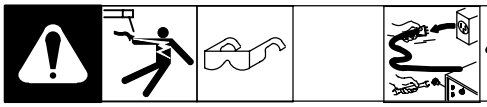


Work like a Pro!

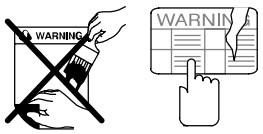
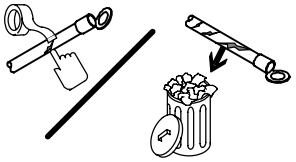
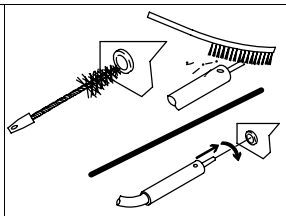
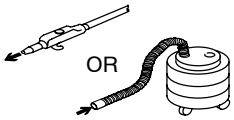
Pros weld and cut safely. Read the safety rules at the beginning of this manual.

SECTION 5 – MAINTENANCE AND TROUBLESHOOTING

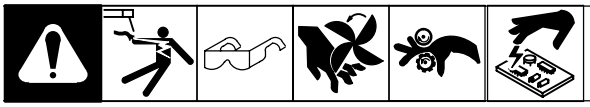
5-1. Routine Maintenance



Disconnect power before maintaining.

	✓ = Check ◇ = Change ◯ = Clean ☆ = Replace * To be done by Factory Authorized Service Agent			
Every **3** Months	 ☆ Damaged Or Unreadable Labels	 ☆ Cracked Weld cables	 ◯✓ Weld Connections	
Every **6** Months	 ◯ Inside Unit			

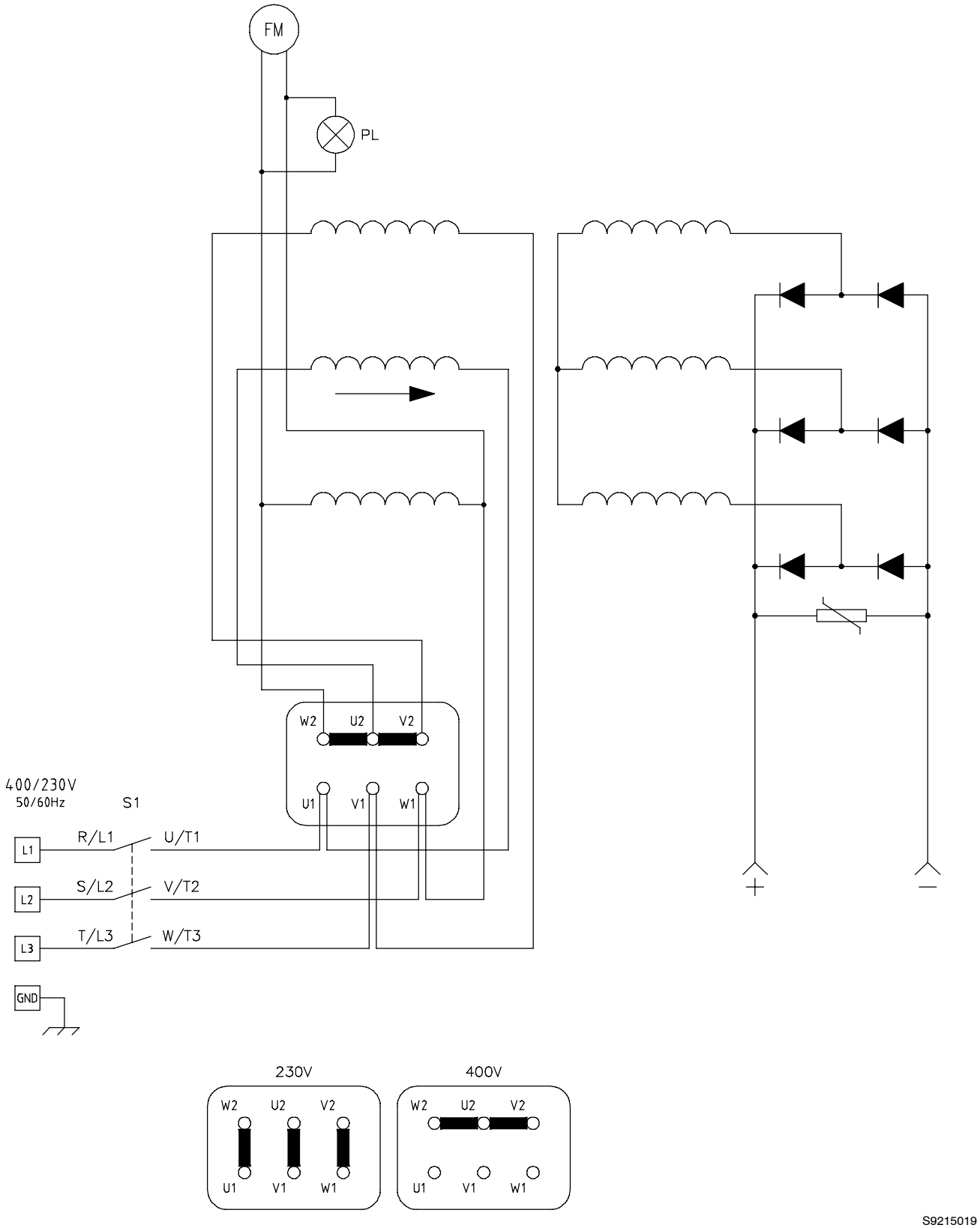
5-2. Troubleshooting



Trouble	Remedy
No weld output; fan does not run.	Be sure Power switch is On (see Section 4-1).
	Be sure line disconnect switch is in On position.
	Check and replace line fuses if open. Reset breakers if necessary.
Fan does not run; weld output okay.	Be sure nothing is blocking movement of fan. If fan does not run freely, replace fan motor.
Erratic or improper weld output.	Clean and tighten all weld cable connections.
	Check for proper size and type of cable (see Section 3-7).
	Check for proper input and output connections (see Sections 3-7 and/or 3-11).
	Replace electrode.
Erratic arc with excessive spatter.	Use dry, properly stored electrodes.
	Shorten arc length.
	Reduce amperage setting.
Electrode freezing to work.	Increase amperage setting.
	Increase arc length.
	Use dry, properly stored electrodes.
Low weld output with no control.	Check position of Amperage Control (see Section 4-1).
Limited output and low open-circuit voltage.	Check incoming power for correct voltage. Replace line fuse if open (see Section 3-11).
	Check for proper input and output connections (see Sections 3-7 and/or 3-11).

SECTION 6 – ELECTRICAL DIAGRAMS

⚠ WARNING	• Do not touch live electrical parts. • Disconnect input power or stop engine before servicing. • Do not operate with covers removed. • Have only qualified persons install, use, or service this unit.
ELECTRIC SHOCK HAZARD	



S9215019

Figure 6-1. Circuit Diagram For Blue Thunder 253 And 403 Models (230/400 V)

⚠ WARNING	• Do not touch live electrical parts. • Disconnect input power or stop engine before servicing. • Do not operate with covers removed. • Have only qualified persons install, use, or service this unit.
ELECTRIC SHOCK HAZARD	

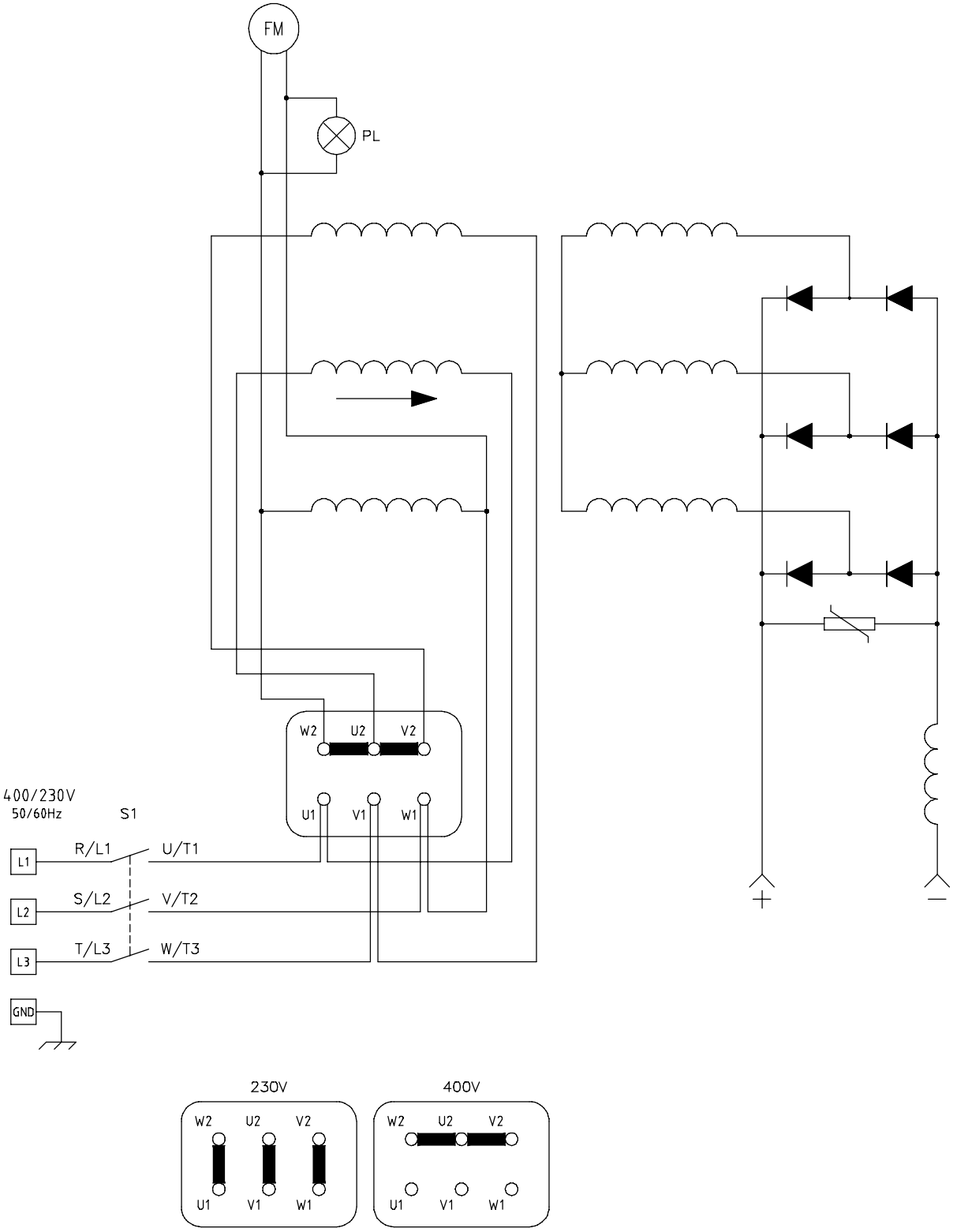


Figure 6-2. Circuit Diagram For Blue Thunder 253 And 403 Models (380/520 V)

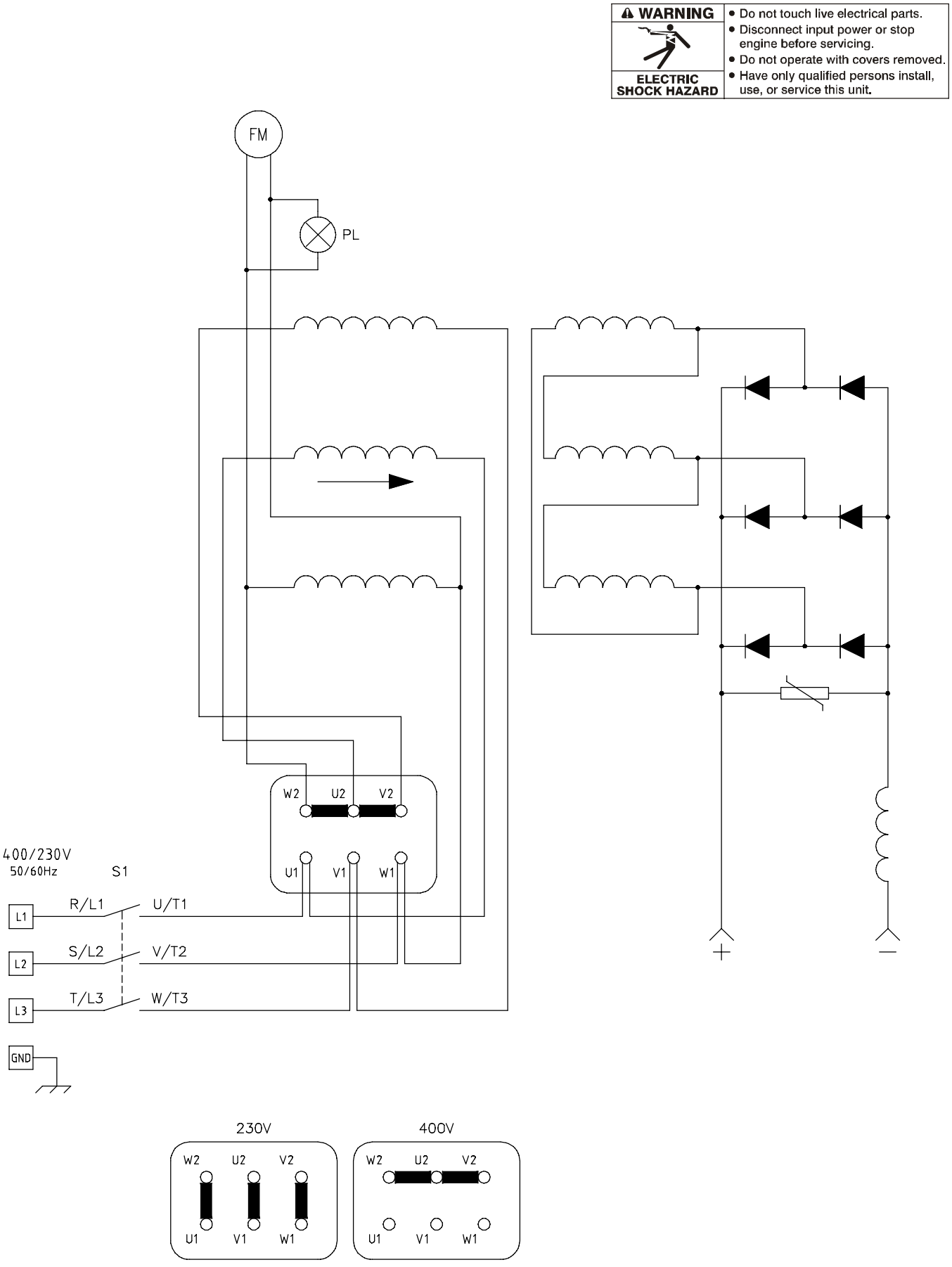
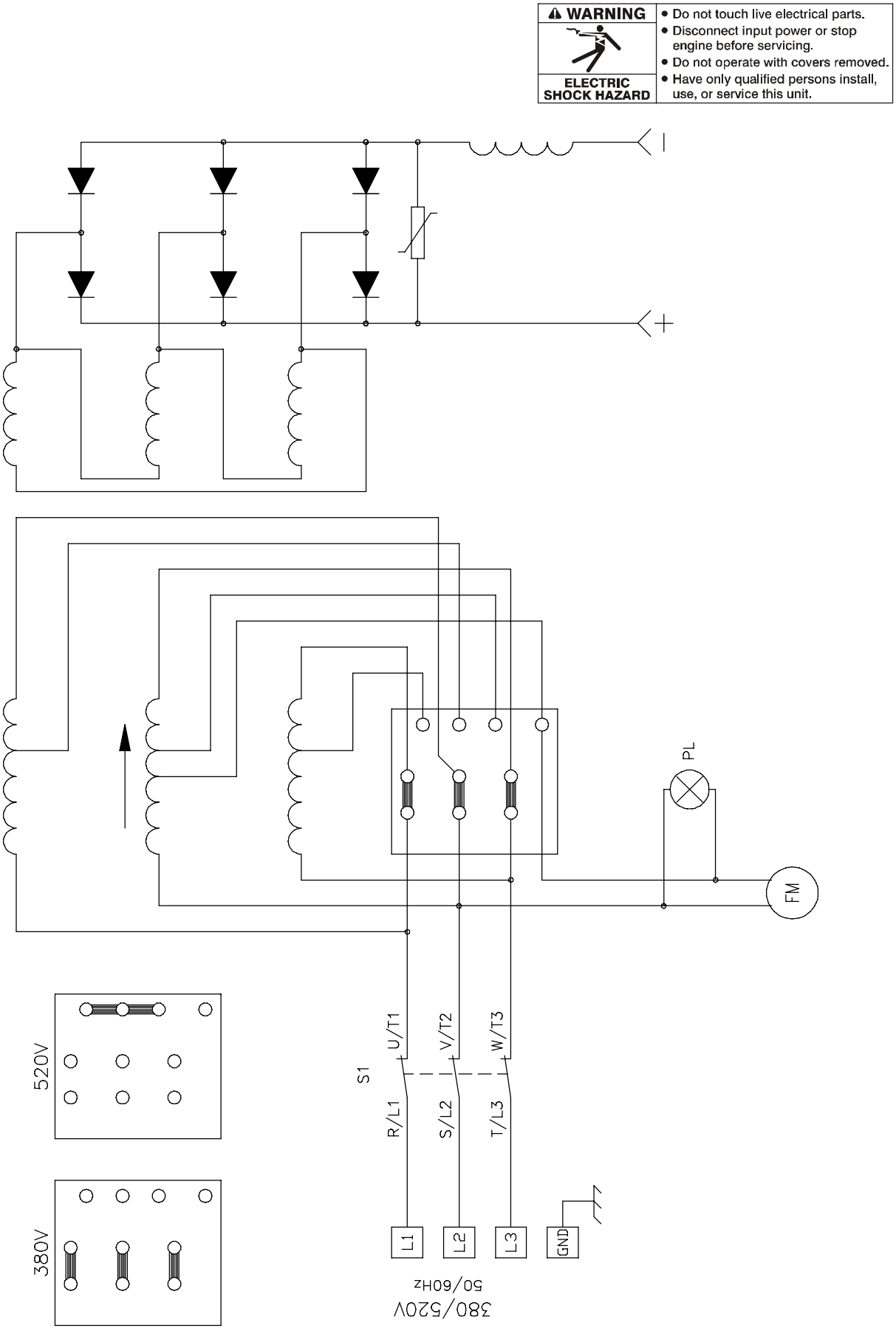


Figure 6-3. Circuit Diagram For Blue Thunder 343 And 443 Models (230/400 V)



S9215018

Figure 6-4. Circuit Diagram For Blue Thunder 343 And 443 Models (380/520 V)

☞ *Hardware is common and not available unless listed.*

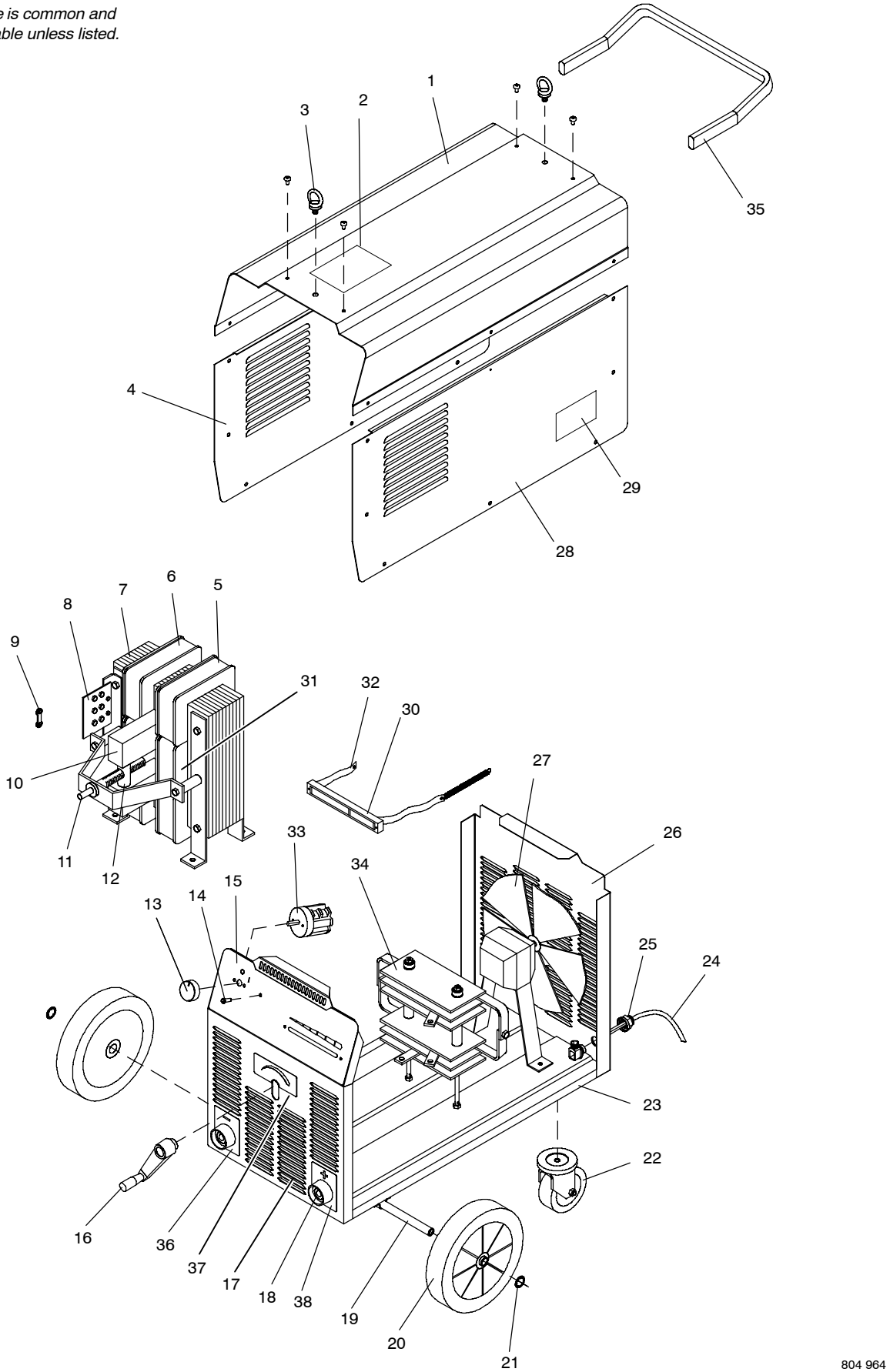


Figure 7-1. Blue Thunder 253

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 7-1. Blue Thunder 253

1		+156121032	Upper Panel	1
2		176254	Label, General Precautionary Wordless	1
3		156011019	Lifting Eye	2
4		156122072	Panel, Left Side	1
5		057015088	Secondary Winding	3
6		057015098	Primary Winding, 230/400 V	2
6		057015102	Primary Winding, 380/520 V	2
7	T1	058021131	Transformer, 3 Ph, 230/400 V	1
7	T1	058021144	Transformer, 3 Ph, 380/520 V	1
8		756069030	Primary Voltage Terminal Board, 230/400 V	1
8		756069035	Primary Voltage Terminal Board, 380/520 V	1
9		556070015	Primary Terminal Link	3
10		056059265	Shunt	2
11		556019047	Regulation Screw	1
12		057029003	Shunt Yoke	1
13		056020044	Knob, Pointer	1
14	PL	056072078	White “Power On” LED	1
15		756029008	Nameplate, Front	1
16		056002010	Hand Wheel With Handle	1
17		156118048	Front Panel	1
18		056076152	Dinse Socket, 50 Sqmm, Cx31	2
19		156012079	Axle	1
20		056054056	Wheel, Rear Fixed	2
21		156023157	Wheel Retaining Clip	2
22		056054058	Pivoting Wheel	2
23		156118007	Base	1
24		256071008	Primary Input Cable	1
25		656089026	Cable Clamp, Hole D.30	1
26		156118049	Panel, Rear	1
27	FM	057035008	Fan Assembly 230 V	1
28		+156122073	Panel, Right Side	1
29		207291	Label, Electric Shock Input	1
30		656062010	Scale Holder	1
31		057015103	Central Primary Winding 380/520 V	1
32		176109017	Regulation Index	1
33	S1	056067221	Switch	1
34	SR1	056050139	Rectifier	1
35		156002019	Handle	1
36		956142592	Negative Welding Terminal	1
37		956142590	Label, Increase/Decrease Weld Output	1
38		956142591	Positive Welding Terminal	1

* Recommended Spare Parts.

\+ When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

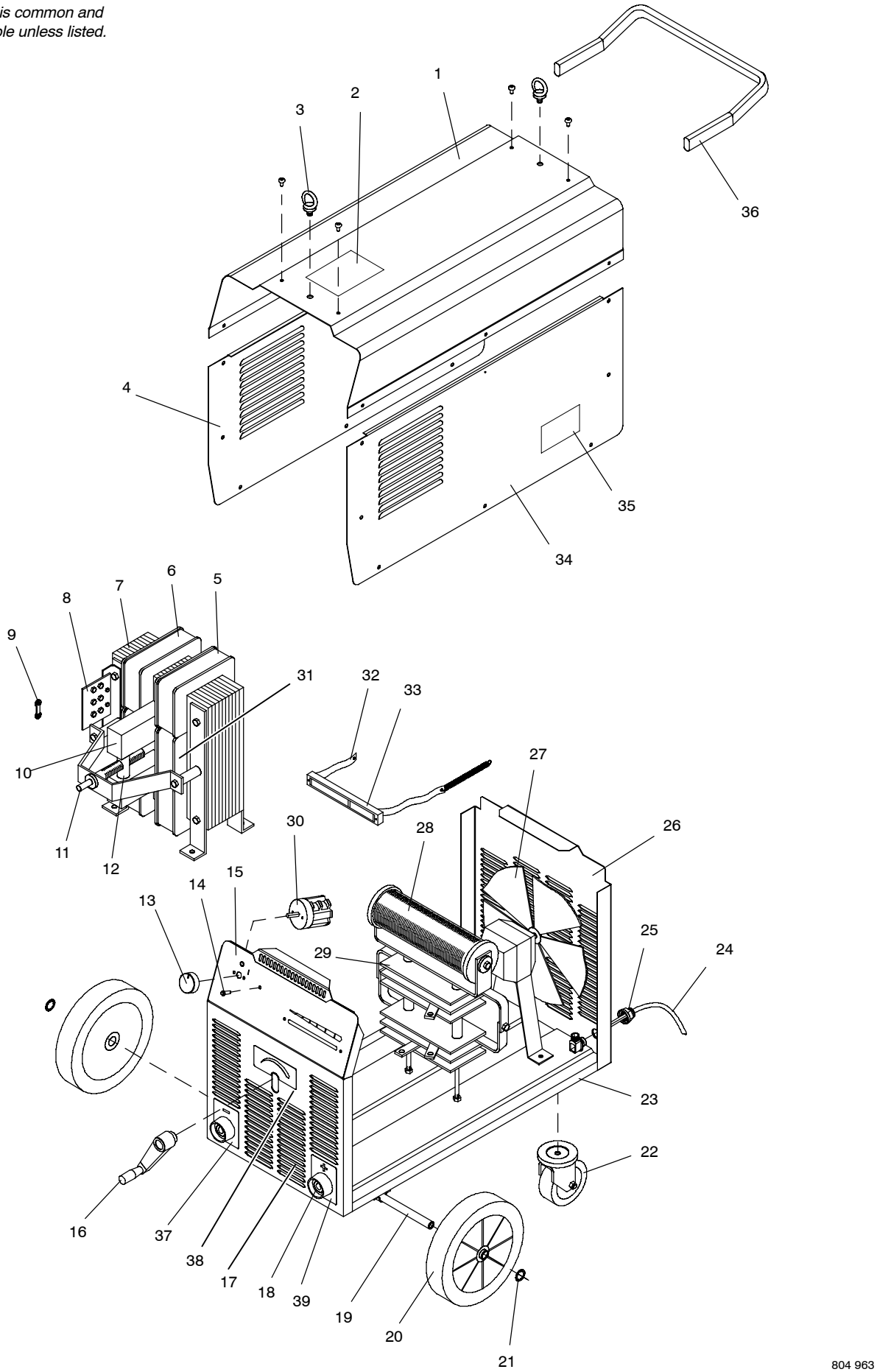


Figure 7-2. Blue Thunder 343

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 7-2. Blue Thunder 343

1		+156121032	Upper Panel	1
2		176254	Label, General Precautionary Wordless	1
3		156011019	Lifting Eye	2
4		156122072	Panel, Left Side	1
5		057015063	Secondary Winding	3
6		057015077	Primary Winding, 380/520 V	2
6		057015099	Primary Winding, 230/400 V	2
7	T1	058021097	Transformer, 3 Ph, 380/520 V	1
7	T1	058021132	Transformer, 3 Ph, MMA, 230/400 V	1
8		756069035	Primary Voltage Terminal Board, 380/520 V	1
8		756069030	Primary Voltage Terminal Board, 230/400 V	1
9		556070015	Primary Terminal Link	6
10		056059266	Shunt, 65 X 69	2
11		556019048	Regulation Screw, M24, L=245	1
12		057029003	Shunt Yoke	1
13		056020044	Knob, Pointer	1
14	PL	056072078	White “Power On” LED	1
15		756029009	Nameplate, Front	1
16		056002010	Hand Wheel	1
17		156118048	Front Panel	1
18		056076152	Dinse Socket, 50 Sqmm, Cx31	2
19		156012079	Axle	1
20		056054056	Wheel, Rear Fixed	2
21		156023157	Wheel Retaining Clip	2
22		056054058	Pivoting Wheel	2
23		156118007	Base	1
24		057014053	Primary Input Cable 4 x 4.0 mm	1
25		656089026	Cable Clamp, Hole D.30	1
26		156118049	Panel, Rear	1
27	FM	057035008	Fan Assembly 230 V	1
28		057098004	Choke	1
29	SR1	056050127	Rectifier	1
30	S1	056067211	Switch	1
31		057015076	Primary Winding 380/520 V	1
32		176109019	Regulation Index	1
33		656062010	Scale Holder	1
34		+156122073	Panel, Right Side	1
35		207291	Label, Electric Shock Input	1
36		156002019	Handle	1
37		956142592	Negative Welding Terminal	1
38		956142590	Label, Increase/Decrease Weld Output	1
39		956142591	Positive Welding Terminal	1

* Recommended Spare Parts.

\+ When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

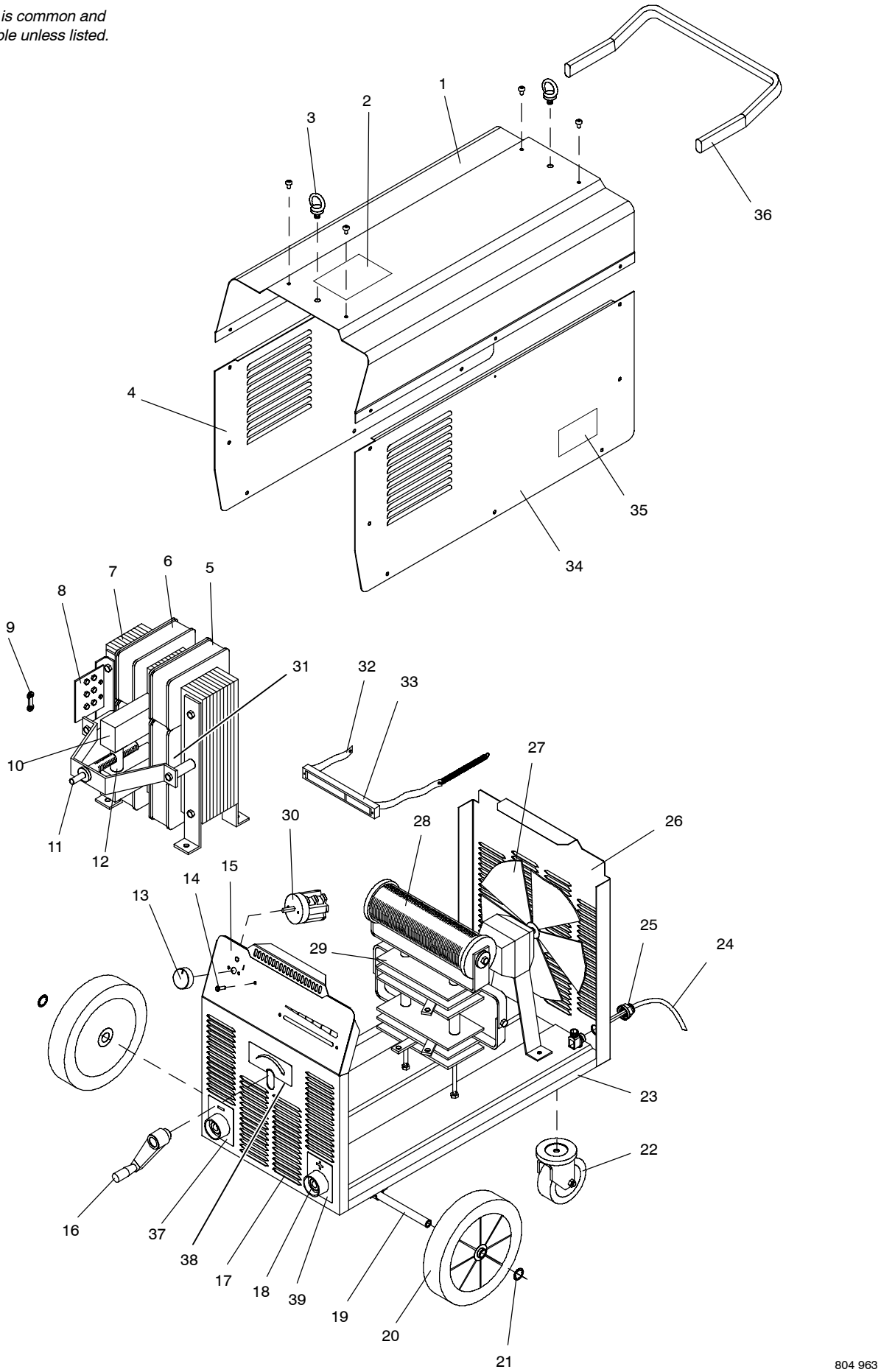


Figure 7-3. Blue Thunder 403

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 7-3. Blue Thunder 403

1		+156121032	Upper Panel	1
2		176254	Label, General Precautionary Wordless	1
3		156011019	Lifting Eye	2
4		156122072	Panel, Left Side	1
5		057015100	Secondary Winding	3
6		057015101	Primary Winding, 230/400 V	2
6		057015104	Primary Winding, 380/520 V	2
7	T1	058021142	Transformer, 3 Ph, 230/400 V	1
7	T1	058021145	Transformer, 3 Ph, 380/520 V	1
8		756069030	Primary Voltage Terminal Board 230/400 V	1
8		756069035	Primary Voltage Terminal Board 380/520 V	1
9		556070015	Primary Terminal Link	3
10		056059280	Shunt	2
11		556019048	Regulation Screw	1
12		057029003	Shunt Yoke	1
13		056020040	Knob, Pointer	1
14	PL	056072078	White “Power On” LED	1
15		756029010	Nameplate, Front	1
16		056002010	Hand Wheel With Handle	1
17		156118048	Front Panel	1
18		056076152	Dinse Socket, 50 Sqmm, Cx31	2
19		156012079	Axle	1
20		056054056	Wheel, Rear Fixed	2
21		156023157	Wheel Retaining Clip	2
22		056054058	Pivoting Wheel	2
23		156118007	Base	1
24		057014054	Primary Input Cable 4 x 6, M4	1
25		656089026	Cable Clamp, Hole D.30	1
26		156118049	Panel, Rear	1
27	FM	057035009	Fan Assembly 230 V	1
28		057098016	Choke	1
29	SR1	056050140	Rectifier	1
30	S1	056067210	Switch	1
31		057015105	Central Primary Winding 380/520 V	1
32		176109018	Regulation Index	1
33		656062010	Scale Holder	1
34		+156122073	Panel, Right Side	1
35		207291	Label, Electric Shock Input	1
36		156002019	Handle	1
37		956142592	Negative Welding Terminal	1
38		956142590	Label, Increase/Decrease Weld Output	1
39		956142591	Positive Welding Terminal	1

*Recommended Spare Parts.

\+ When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

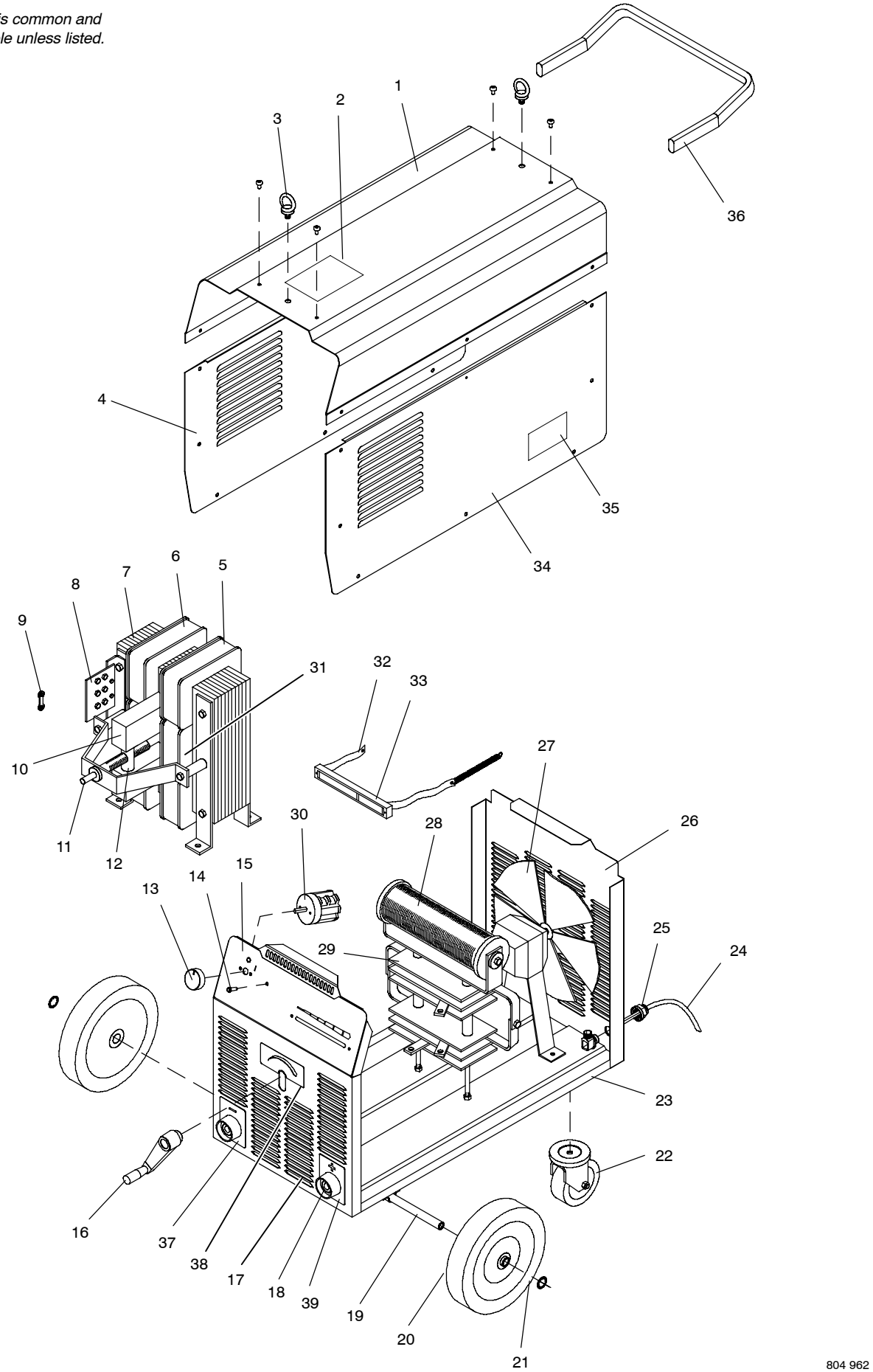


Figure 7-4. Blue Thunder 443

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 7-4. Blue Thunder 443

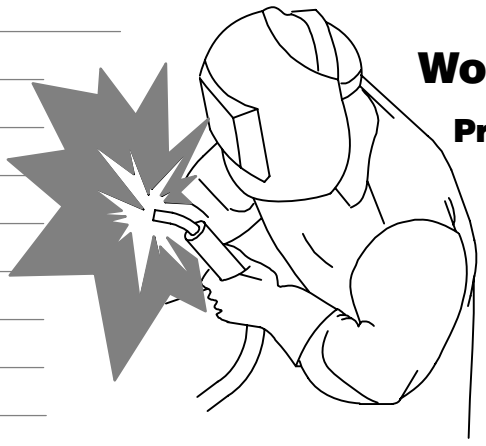
1		+156121033	Upper Panel	1
2		176254	Label, General Precautionary Wordless	1
3		156011019	Lifting Eye	2
4		156122074	Panel, Left Side	1
5		057015065	Secondary Winding, 70 X 115 Al	2
6		057015080	Primary Winding, 380/520 V	2
6		057015091	Primary Winding, 230/400 V, 70 X 115 Al	3
7	T1	058021098	Transformer, 3 Ph, MMA, 380/520 V, 70 X 115 Al	1
7	T1	058021114	Transformer, 3 Ph, MMA, 230/400 V, 70 X 115 Al	1
8		756069035	Primary Voltage Terminal Board, 380/520 V	1
8		756069030	Primary Voltage Terminal Board, 230/400 V	1
9		556070015	Primary Terminal Link	6
10		056059256	Shunt, 65 X 69	2
11		556019043	Regulation Screw, M24, L=245	1
12		057029004	Shunt Yoke, D.35, L=150	1
13		056020044	Knob, Pointer	1
14	PL	056072078	White “Power On” LED	1
15		756029011	Nameplate, Front	1
16		056002015	Hand Wheel, D.200	1
17		156118050	Front Panel	1
18		056076152	Dinse Socket, 50 Sqmm, Cx31	2
19		156012080	Axle, D.25, L=619	1
20		056054057	Wheel, Rear Fixed	2
21		156023156	Wheel Retaining Clip	2
22		056054059	Pivoting Wheel, D.125	2
23		156118008	Base	1
24		057014054	Primary Input Cable 4 x 6, M4	1
25		656089026	Cable Clamp, Hole D.30	1
26		156118051	Panel, Rear	1
27	FM	057035009	Fan Assembly 230 V, P.3, 230 V	1
28		057098016	Choke, Al, D.9,5, Tube, L=320	1
29	SR1	056050128	Rectifier, Pts 550	1
30	S1	056067210	Switch, 32 A, A 3202	1
31		057015079	Primary Winding 380/520 V	1
32		176109020	Regulation Index	1
33		656062010	Scale Holder	1
34		+156122075	Panel, Right Side	1
35		207291	Label, Electric Shock Input	1
36		156121010	Handle	1
37		956142592	Negative Welding Terminal	1
38		956142590	Label, Increase/Decrease Weld Output	1
39		956142591	Positive Welding Terminal	1

* Recommended Spare Parts.

\+ When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Notes



Work like a Pro!

Pros weld and cut safely. Read the safety rules at the beginning of this manual.

Notes

Notes

TRUE BLUE® WARRANTY

Effective January 1, 2009

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, ITW Welding Products Italy warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date the equipment was delivered to the original retail purchaser, not to exceed eighteen months after the equipment is shipped to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers limited to only include SCRs, diodes, and discrete rectifier components where applicable
   * Inverters (Input and Output Rectifiers Only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Sources (Unless Otherwise Stated)
   * Water Coolant Systems (Integrated)
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 2 Years — Parts and Labor
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * Process Controllers
   * RFCS Foot Controls
   * IHPS Power Sources and Coolers
   * Water Coolant Systems (Non-Integrated)
   * HF Units
   * Running Gear/Trailers
   * Field Options (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 1 Year — Parts and Labor Unless Specified
   * DC 253 & 403 Rectifier (April 06>)
   * Migmatic 171 (April 06>)
5. 6 Months — Batteries
6. 90 Days — Parts
   * MIG Guns
   * Induction Heating Coils and Blankets
   * Remote Controls
   * Accessory (Kits)
   * Replacement Parts (No labor)
   * Spoolmate Spoolguns
   * Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at ITW Welding Products Group Europe or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Miller

Owner's Record

Please complete and retain with your personal records.

Model Name Serial/Style Number

Purchase Date (Date which equipment was delivered to original customer.)

Distributor

Address

Country Zip/Postal Code

For Service

Contact a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:

- Welding Supplies and Consumables
- Options and Accessories
- Service and Repair
- Replacement Parts
- Owner's Manuals

Contact the Delivering Carrier to:

File a claim for loss or damage during shipment.

For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.

ITW Welding Products Italy S.r.l.
Via Privata Iseo, 6/E
20098 San Giuliano
Milanese, Italy
Phone: 39 (0) 2982901
Fax: 39 (0) 298290-203
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ORIGINAL INSTRUCTIONS – PRINTED IN USA

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